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10/521,286

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Ronald L Steen

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LERNER GREENBERG STEMER LLP
P O BOX 2480
HOLLYWOOD, FL 33022-2480

EXAMINER

GUHARAY, KARABI

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,286	Applicant(s) STEEN ET AL.	
	Examiner Karabi Guharay	Art Unit 2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) 24, 35-39, 59, 72-76, 91, 96-100, 123-127 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/12/2005</u> . | 6) <input type="checkbox"/> Other: ____. |

Continuation of Disposition of Claims: Claims pending in the application are 1-8,15,19-24,28,29,31-44,48,53,57-61,65,66,68-77,82,84,89-91,95-102,104,116,117,121-129 and 131-135.

Continuation of Disposition of Claims: Claims rejected are 1-7,15,19-23,28,29,31-34,40-44,48,53,57,58,60,61,65,66,68-71,77,82,84-87,89,90,95,101,102,104,116,117,121,122,128,129 and 131-135.

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Claim Objections

Claims 15 & 48 are objected to because of the following informalities: Both claims are dependent from canceled claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 & 77 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the substrate solder or stud bump" in line 8. There is insufficient antecedent basis for this limitation in the claim.

"Base solder or stud bumps" are mentioned earlier, so appropriate correction is required.

For examination purpose it is considered to be "the base solder or stud bumps".

Claim 77 recites "the elongated lens" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-5, 7, 20, 40, 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Bennion (US 4,774, 434).

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Regarding claim 1, Bennion discloses a light source (Fig 10) comprising at least one light emitting diode(LED) assembly, said LED assembly including a base substrate (1020, said base substrate including base solder or stud bumps, a submount substrate (104) mounted on the base substrate, said submount substrate including submount solder or stud bumps (109), and an LED semiconductor chip (100) mounted on the submount substrate (100) and in electrical contact with the submount solder or stud bumps, said LED semiconductor chip being electrically coupled to the base substrate (1020 through electrical vias (105) extending through the submount substrate (104) that are in electrical contact with the base substrate solder or stud bumps and the submount solder or stud bumps (lines 35-64 of column 12).

Regarding claim 2, Bennion discloses the light source according to claim 1 further comprising a molded lens (encapsulating layer 112) formed over the LED assembly (see Abstract).

Regarding claim 4, Bennion discloses the light source according to claim 2 wherein the molded lens (112) is in contact with the LED assembly so that there is not an air gap between the lens and the LED semiconductor chip (Fig 10).

Regarding claim 5, Bennion discloses the light source according to claim 4 wherein the lens (encapsulation 112) is molded to the base substrate and completely encapsulates the submount substrate (104) and the LED semiconductor chip (Fig 10).

Regarding claim 7, Bennion discloses the light source according to claim 2, wherein the at least one LED assembly is a plurality of LED assemblies each including a separate molded lens (line 61 of column 12-line 10 of column 13).

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Regarding claim 20, Bennion discloses the light source according to claim 2, wherein the molded lens (112) is a primary optic dome (lens) formed over the LED assembly (see Fig 10).

Regarding claim 40, Bennion discloses a light source comprising at least one light emitting diode (LED) assembly (see Fig 10), the LED assembly including an LED semiconductor chip (100) and a substrate (102), said semiconductor chip being electrically coupled to the substrate, said LED assembly further including a molded primary optic (encapsulating dome 112 forming lens) formed over the LED assembly in contact with the substrate so that there is not an air gap between the primary optic and the LED semiconductor chip.

Regarding claim 44, Bennion discloses the light source according to claim 40, wherein the primary optic (encapsulation 112) is molded to the substrate and completely encapsulates the LED semiconductor chip (Fig 10).

Claims 1, 40 & 65-70 are rejected under 35 U.S.C. 102 (b) as being anticipated by Koike et al. (US 6345903).

Regarding claim 1, Koike et al. disclose a light source (Fig 3) comprising at least one light emitting diode (LED) assembly (11), said LED assembly including a base substrate (mother board 18), said base substrate including base solder or stud bumps (lines 55-63 of column 6), a submount substrate (12) mounted on the base substrate (18), said submount substrate including sub-mount solder or stud bumps (conductive adhesive 22; also see lines 18-23 of column 10), and an LED semiconductor chip (15) mounted on the sub-mount substrate and in electrical contact with the sub-mount solder or stud bumps (22), said LED semiconductor chip being electrically coupled to the base substrate through electrical vias (16a, 16b) extending through the

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sub-mount substrate that are in electrical contact with the substrate solder or stud bumps and the sub-mount solder or stud bumps (lines 53 of column 4-lines 7 of column 5).

Regarding claims 21 & 60 , Koike et al. disclose the light source according to claim 1 wherein the at least one LED semiconductor assembly is a plurality of LED assemblies providing a predetermined light pattern, wherein each LED assembly in the plurality of LED assemblies provides a portion of the intensity of the entire light pattern (Fig 21).

Regarding claims 22 & 61, Koike et al. disclose the light source according to claim 1 wherein an electrode path (cathode and anode) printed on the semiconductor chip defines a light beam cutoff to define a shape of the beam emitted from the LED assembly (see Figs 3& 4).

Regarding claims 23 & 58, Koike et al. disclose the light source according to claim 1 wherein the at least one LED assembly further includes a phosphor layer deposited over the LED semiconductor chip, said LED semiconductor chip emitting blue light and said phosphor layer converting the blue light to white light (lines 39-46 of column 5).

Regarding claim 40, Koike et al. discloses in (Figs 3, 8 & 10) a light source comprising at least one light emitting diode (LED) assembly, the LED assembly including an LED semiconductor chip (15) and a substrate (12), said semiconductor chip being electrically coupled to the substrate, said LED assembly further including a molded primary optic (mold 36 filled with encapsulator 27: see Fig 8) formed over the LED assembly in contact with the substrate so that there is not an air gap between the primary optic and the LED semiconductor chip (lines 43-48 of column 7).

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Regarding claim 131-132 & 135, Koike et al. disclose a method of making an LED lamp, the method comprising electrically coupling an LED to a substrate (12) by a solder reflow process (see lines 18-22 of column 10; method of flip chip bonding using solder bumps, which includes solder reflow and reflow joining) depositing a phosphor layer, wherein the LED is a blue LED and the phosphor layer generates white light from the blue light (25 containing phosphor; lines 39-44 of column 5).

Claims 77, 82, 85, 89, 95 and 101-1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Hochstein (US 2001/0030866).

Regarding claim 77, Hochstein discloses a vehicle head light comprising at least one head light unit (see Fig 1; paragraphs 24, 26) including an optical structure (40), said at least one headlight unit further including plurality of spaced apart primary optic lenses (26) optically coupled to a front face of the optical structure (40) light emitting diode assemblies (shown separately in Fig 2) where a single LED assembly (see Fig 2) is provided for each primary optic lens (26) wherein each LED assembly emits a beam of light that is focused and directed by the lens and is collected and directed by the optical structure (prisms formed in the inner surface of #40) to be emitted from the front surface of the optical structure as a single beam of light wherein each LED assemblies provide a portion of the intensity of the entire pattern,

Regarding claims 82 & 85, Hochstein discloses each lens (26) is an injection molded dome (paragraph 33; Figs 2-3).

Regarding claim 89, Hochstein discloses that the plurality of LED assemblies and lenses is six lenses and six LED assemblies (Fig 1).

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Regarding claim 95, Hochstein discloses that the plurality of LED assemblies is mounted to a common carrier (32; see Fig 1).

Regarding claims 101-102, Hochstein discloses that the carrier (32) includes a heat sink (30) having plurality of spaced apart fins (32: see Fig 2; Paragraph 22).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3, 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennion as applied to claims 1 & 40.

Regarding claims 3 & 41-42, Bennion discloses a molded lens formed of an encapsulating material but is silent about whether the lens is an injection molded lens. However, injection molding is a suitable method for forming molded lens. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use injection

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molding method to form injection molded lens, since selection of known method for known purposes is within the skill of art.

Claims 133-134 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koike et al. as applied to claim 131.

Regarding claims 133-134, Koike et al. discloses a solder bump for connecting the LEDS to the substrate, but is silent about the composition of solder. However, tin-lead or tin-copper and tin-silver are commonly used solder material used as soldering process having melting temperature above 200degree centigrade.

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose one of tin-lead or tin-copper and tin-silver solder, since selection of known material for known purposes is within the skill of art.

Claims 6 & 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennion as applied to claim 2 above, and further in view of Romero et al. (US 5565705).

Regarding claim 6, Bennion discloses that the light source further comprises a further encapsulating material (111) formed between the LED assembly and the molded lens or primary optic (112). But, Bennion is silent about the encapsulant being silicon gel.

However, Romero et al. in the same field of LED teaches that silicon gel, epoxy is suitable materials used for encapsulating LED assembly (lines 55-61 of column 9).

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose silicon gel as the material for encapsulation in the device of Bennion, since selection of known material for known purpose is within the skill of art.

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Claims 15, 19, 23, 48, 53, 57-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennion as applied to claim 2 or claim 40 above, and further in view of Vriens et al. (US 5813753).

Regarding claims 15, 19, 23, 48, 53, 57-58, Bennion discloses all the limitations of claims (see rejection of claim 2 & 40), except for molded lens or primary optic includes a phosphor material for converting blue light from LED chip to white light, or phosphor layer deposited over the LED chip to convert blue light emitted from LED chip to white light and reflective foil formed to the lens.

However, Virens et al. in the same field of LED (Fig 2), discloses that the molded lens (25) includes phosphor material (24) for converting blue light from LED chip to white light, and a reflective foil 23 formed to the lens to reflect the edge light (lines 17-56 of column 3).

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to include phosphor material in the molded lens of Bennoin so as to convert light from LED to white light so as to create white light emission device, and also to provide a reflective foil to reflect the edge light.

Claims 28-29, 31-34, 65-66, 68-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennion as applied to claims 2 & 40 above, and further in view of Hochstein (US 2001/0030866).

Regarding claims 28-29 & 65-66, Bennion discloses all the limitations of claim 28-29 & 65-66, except for heat sink mounted to the base substrate including plurality of fins.

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However, in the same field of LED light, Hochstein discloses a heat sink (30 of Fig 1) having plurality of spaced apart fins (32) mounted on a base substrate in order to dissipate heat from LED chip (paragraph 22).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a heat sink as taught by Hochstein, in the device of Bennion so as to dissipate heat generated in the LED chip.

Regarding claims 31-34 & 68-71, Hochstein discloses that the LED light source is automotive light and having a cover (40) and a carrier (32 & 30) to seal the light source from environment (paragraph 24; Fig 1). The same reason for combining as in claims 28-29 & 65-66 applies.

Claims 84, 86-87, 90-91, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hochstein (US 2001/0030866) and further in view of Koike et al. (US 6,345,903).

Regarding claim 84, Hochstein discloses all the limitations of claim 84, except for a reflective foil formed to the lens.

However, in the same field of LED light, Koike et al. teaches lens (25) having reflective frame 21 (lines 15-42 of column 7) in order to reflect light from the reflecting frame so as to redirect the light toward the lens (11; lines 33-50 of column 6).

Thus, it would have been obvious to one having ordinary skill in the art to have a reflective foil in the lens as taught by Koike et al. in the device of Hochstein so as to avoid loss of light emission.

Regarding claims 86-87 & 90, Hochstein fail to disclose phosphor for converting light from LED assembly which emit blue light and convert it to white light.

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However, Koike et al. disclose a phosphor for converting blue light emitted from LED to white light (lines 39-67 of column 5).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have phosphor for converting blue light to white as taught by Koike et al. in the device of Hochstein so as to generate uniform white light.

Claims 104, 116 are rejected under 35 U.S.C. 103(a) as being unpatentable over koike et al. as applied to claim 1 above, and further in view of Hochstein (US 2001/0030866).

Regarding claim 104, Koike et al. discloses a light source comprising plurality of light emitting diode (LED) assemblies, where a single LED assembly is provided for each lens, said LED assembly including a base substrate, said base substrate including base solder or stud bumps, a submount substrate mounted on the base substrate, said submount substrate including submount solder or stud bumps, and an LED semiconductor chip mounted on the submount substrate and in electrical contact with the submount solder or stud bumps, said LED semiconductor chip being electrically coupled to the base substrate through electrical vias extending through the submount substrate that are in electrical contact with the substrate solder or stud bumps and the submount solder or stud bumps, wherein each LED assembly emits light that is focused and directed (see rejection of claim 1) by domed lens (28 of Fig 10) as a single beam of light.

However, Koike et al. is silent about the light source being used as headlight unit for vehicle. However, Hochstein discloses that such plurality of LED assembly each having a separate lens can be used as vehicle light (paragraph 24).

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Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the plurality of LED assembly as head light unit since it is suitable to use LEDs for head light for vehicle as evidenced by Hochstein.

Regarding claim 116, Koike et al. disclose the light source according to claim 104 wherein the at least one LED assembly further includes a phosphor layer deposited over the LED semiconductor chip, said LED semiconductor chip emitting blue light and said phosphor layer converting the blue light to white light (lines 39-46 of column 5).

Regarding claim 117, Koike et al. disclose the light source according to claim 1 wherein an electrode path (cathode and anode) printed on the semiconductor chip defines a light beam cutoff to define a shape of the beam emitted from the LED assembly (see Figs 3 & 4).

Regarding claim 121, Koike et al. disclose the light source according to claim 1 wherein the at least one LED semiconductor assembly is a plurality of LED assemblies providing a predetermined light pattern, wherein each LED assembly in the plurality of LED assemblies provides a portion of the intensity of the entire light pattern (Fig 21).

Regarding claim 122, Koike et al. disclose that all the LED assemblies are mounted to a common carrier (substrate 31 of Fig 10 & Fig 21).

Regarding claims 128-129, Koike et al. fail to disclose that the carrier includes a heat sink having plurality of spaced apart fins. However Hochstein discloses a heat sink (30 of Fig 1) having plurality of spaced apart fins (32) mounted on a base substrate in order to dissipate heat from the LEDs.

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Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a heat sink as taught by Hochstein, in the device of Koike et al. so as to dissipate heat generated in the LED chip.

Allowable Subject Matter

Claims 24, 35-39, 59, 72-76, 91, 96-100 and 123-127 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is 571-272-2452. The examiner can normally be reached on Monday-Friday 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minh-Toan Ton can be reached on 571-272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karabi Guharay/
Primary Examiner, Art Unit 2889

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